

## Abstracts

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crucial as the profession continues to work toward establishing a sustainable and economically viable role within the dynamic health care system.

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# A MODEL TO ESTIMATE INCREASE IN REVENUE FROM IMPLEMENTING MEDICATION ADHERENCE MANAGEMENT SERVICES IN COMMUNITY PHARMACIES

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**OBJECTIVES:** Programs to increase medication adherence are receiving increased attention. One incentive for pharmacies to implement such services is the potential increase in revenue. The objective was to estimate changes in revenue a community pharmacy during the first three years after implementing a new medication management service (RxSync Service<sup>SM</sup>). **METHODS:** A Markov economic model was developed using Excel. Model inputs are average week day/weekend patient volumes, current average medication possession ratio (MPR) for chronic medication prescriptions, expected MPR for patients enrolled in the service, goals for enrolling existing and new patients into the service, current gross prescription sales, and net profit on prescription sales. A three year time frame was used to estimate yearly increases in net revenue and monthly patient enrollment and increases in prescription volume. Model assumptions are based on data collected from five pharmacies participating in a project with the RxSync Service<sup>SM</sup>. **RESULTS:** A conservative scenario (70% of current target patients in 18 months) resulted in a peak of 414 additional prescriptions/month at month 30 and increases in net revenue of \$2956, \$8415, and \$9490 for the first 3 years. An aggressive scenario (12 months) resulted in a peak of 414 additional prescriptions/month at month 21 and net revenue increases of \$4896, \$9364, and \$9531. Adding a goal of 200 new patients, starting at month 6 and finishing 12 months later resulted in a peak of 1,208 new prescriptions/month at month 21 and net revenue increases of \$8,438, \$26,386, \$27,806. **CONCLUSIONS:** The model demonstrates that an effective medication adherence management program can increase net revenue for a community pharmacy. The increases will be relatively small the first year of implementation unless a fairly aggressive recruitment strategy is used. If economic factors are importing when starting the service, recruitment of new patients should be a high priority in the implementation strategy.

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# ADVERSE DRUG REACTIONS AND COST IMPLICATED- NEED FOR VIGILANT MONITORING

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**OBJECTIVES:** Adverse drug reactions (ADRs) accounts for increased morbidity, mortality, and have a significant impact on health care cost. This study was planned to assess the incidence and pattern of ADRs among hospitalized patients in nephrology department and to estimate the direct cost attributable to ADRs. **METHODS:** This was a prospective surveillance study which included all patients admitted to nephrology department of tertiary care hospital within eight months period. Patients were monitored from the day of admission till the day of discharge for the occurrence and reporting of ADRs through intensive monitoring by investigator (clinical pharmacist) and spontaneous reporting by health care professionals. ADRs reported were analysed for various parameters. **RESULTS:** Out of 259 hospitalized patients, 58 patients developed 94 ADRs with an overall incidence of 22.39%. In 23 (8.88%) patients, ADR was present at the time of hospital admission which accounted for 34 ADRs (36.17%). In 3.86% of patients, it was the reason for hospital admission. Drug class most commonly implicated in the ADRs was immunosuppressive agents (45.74%). Type A reactions (93.61%) were more common among patients. Upon causality assessment, majority (53.19%) of the reactions were possible in nature and majority (58.51%) was found to be of moderate severity. Total cost attributed to ADRs was estimated to be Rs 92,019 and average cost incurred for a patient for managing ADR was Rs 1,586.53. **CONCLUSIONS:** Adverse drug reactions occurred commonly in hospitalized patients in nephrology ward. Vigilant monitoring of drugs most commonly implicated in ADRs in nephrology ward like immunosuppressive agents is of utmost importance to avoid extra cost incurred.

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# MORTALITY RATE COMPARISON BETWEEN STATES WITH AND WITHOUT PRESCRIPTION DRUG MONITORING PROGRAMS AND ASSOCIATED FEDERAL COSTS

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**OBJECTIVES:** The federal government provided approximately \$29 million from 2003–2007 to help states establish and maintain prescription drug monitoring programs (PDMPs) aimed at reducing diversion and abuse of pharmaceuticals. The objective of this study is to compare aggregated prescription drug-related mortality rates in states with active PDMPs compared to states with inactive PDMPs. **METHODS:** Data on ten states with prescription drug-related mortality rates are available from the Drug Abuse Warning Network (DAWN). As of 2007, 6 states had active PDMPs: Maine, Massachusetts, New Mexico, Oklahoma, Utah and Virginia. Whereas four states had inactive PDMPs: Maryland, New Hampshire, Oregon and Vermont. Independent samples t-test was used to determine significance ( $p = 0.10$ ) in mean mortality rates between active and inactive PDMPs. **RESULTS:** Among the 10

states, 4454 drug-related deaths were reported in 2007. States with active PDMPs received a mean of \$908,756 compared to \$287,056 for states with inactive PDMPs. Among states with active PDMPs, New Mexico had the highest drug-related mortality rate (21.0%) and among states with inactive PDMPs, Maryland had the highest mortality rate (14.6%). A t-test showed no significant difference ( $p = 0.37$ ) in mean  $\pm$  SD drug-related death rate per 100,000 people associated with active PDMPs ( $14.2 \pm 5.4$ ) compared to states with inactive PDMPs ( $11.9 \pm 2.2$ ). **CONCLUSIONS:** Drug-related mortality rates were lower in states with inactive programs, when compared to states with active PDMPs. This result may be representative of political pressure to enact programs in states with higher mortality rates. Although the sample size represents 20% of states, results should be viewed with caution. PDMPs are designed to decrease diversion and abuse, as well as associated morbidity and mortality; however more research is needed to determine their effectiveness and to devise ways to maximize their utility.

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# USEFULNESS OF COST PER DEFINED DAILY DOSE (DDD) TO IDENTIFY PROBLEMATIC DRUGS IN MEDIUM- AND HIGH-LEVEL COMPLEXITY HOSPITALS FROM COLOMBIA

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**OBJECTIVES:** Evaluate the usefulness of cost per DDD to identify problematic drugs in medium- and high-level complexity hospitals from Colombia. **METHODS:** This was a cross-sectional study where drug prescriptions were evaluated in 331 second- and third-level complexity hospitals from 27 Colombian departments during 2006–2007. **RESULTS:** A total of 38,863 prescriptions for 3663 patients were analyzed; 54.7% of them patients affiliated to contributory health care system. The medication consumption was of 8, 39 daily defined doses (DDD)/1000 patients. Filgastrim and Interferon represent almost 48% of DDDs of DU90%. The overall cost per DDD was US\$3.9, being this cost lower in drugs of DU90% than drug out of this list (US\$1.79 vs. US\$10.24,  $p = 0.03$ ). Also the cost per DDD was higher in patients affiliated to contributory health care system than patients affiliated to public health care system (US\$ 3.01 vs. US\$2.09,  $p = 0.03$ ). The antineoplastic and immunomodulating agents (Code L, ATC Classification System), and drugs of musculoskeletal system (Code M, ATC Classification System) were the drugs with higher cost per DDD (US\$ 1686 and US\$8.9, respectively). **CONCLUSIONS:** In this population, antineoplastic and immunomodulating agents have cost per DDD that were 100 times higher than other drugs, also the estimation of cost per DDD allows identifying problematic drugs in this population such as Filgastrim and Interferon which prescriptions must be checked carefully. Were evident differences of drug's cost by type of health care system regardless that do not exist differences of drugs coverage in the Colombian health system by affiliation. The cost per DDD and DU 90% are useful indicators to identify problematic drugs in developing countries.

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# EXCESS HOSPITAL COSTS ATTRIBUTABLE TO MEDICATION ERRORS IN HOSPITALIZED PATIENTS

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**OBJECTIVES:** To calculate the incidence of medication errors (MEs), examine types and causes of MEs, and estimate the excess hospital costs attributable to MEs during hospitalization. **METHODS:** The study population included patients who were hospitalized in the medical/surgical units of two hospitals (176-bed community and 417-bed academic hospitals) from January 2005–December 2006. ME data was collected from hospital-specific voluntary reports for patients who experienced MEs. Hospital costs data was obtained from hospitals' accounting department and were estimated from the payers' point of view. The excess hospital costs if MEs were prevented in patients with MEs were estimated using a recycled prediction method. A generalized linear model with gamma distribution and log link function was used to derive coefficients of the study variables from all patients. Among the patients with ME, the mean cost was predicted using the coefficients derived from all patients, with the assumption that patients without MEs. All costs were converted to 2008 US dollars. **RESULTS:** A total of 470 MEs out of 57,554 patients were identified. The overall rate for MEs was 0.8 errors per 100 admissions and 1.7 errors per 1000 patient-hospitalized days (harmful MEs = 0.4 and non-harmful MEs = 1.3). MEs occurred most frequently in the stage of administration (35.7%), followed by transcription (25.7%), dispensing (18.5%), and ordering (15.5%). The most common types of MEs were wrong time (19.8%), wrong medication (18.1%), and wrong dose (17.0%). About 45% of MEs involved antibiotics, opiates, insulin, and electrolytes and fluid. If patients who experienced MEs during hospitalization were not to have these MEs, their hospital costs would be reduced by \$6,973 (95%CI US\$6,138–7,808). **CONCLUSIONS:** This study demonstrated the importance of reducing medication errors because of its substantial economic burden to our society. Additional studies are needed to assess the cost effectiveness of various strategies in reducing MEs.